CORRECTIVE ACTION PLAN FOR SITE REMEDIATION

UNDERGROUND STORAGE TANK PROGRAM

4954 YORK BOULEVARD
HIGHLAND PARK, CA

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CALIFORNIA REGIONAL WATER
QUALITY CONTROL BOARD
LOS ANGELES REGION

Prepared for:

Mr. Mark Gabay
171 Wilshire Boulevard
Beverly Hills, CA 90210

For Submittal to:

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

Prepared By:

ADVANCED GEOENGINEERING, INC.
3183 F. Airway Avenue, STE 123
Costa Mesa, CA 92626

AGE Project No. 09-41-564-06

March 30, 2009

ADVANCED GEOENGINEERING, INC.
Geotechnical and Environmental Engineering

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CALIFORNIA REGIONAL WATER
QUALITY CONTROL BOARD
LOS ANGELES REGION

March 30, 2009

c/o Charles Company
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

Attention: Mr. Mark Gabay

Subject: **CORRECTIVE ACTION PLAN FOR SITE REMEDIATION**
Underground Storage Tank Program
4954 York Boulevard
Los Angeles, California
AGE Project No. 09-41-564-06

Advanced Geoengineering, Inc. (AGE) is pleased to present the Corrective Action Plan (CAP) for the property located at 4954 York Boulevard in Highland Park, California. The CAP was prepared pursuant to your request in response to the California Regional Water Quality Control Board's (CRWQCB) Directive dated October 24, 2008 to submit a Corrective Action Plan for the subject project site. A copy of the CRQQCB directive is attached for your reference. Should you have any questions regarding this CAP, please do not hesitate to call.

Respectfully submitted,

ADVANCED GEOENGINEERING, INC.

Shahrokh Radvar
Principal Engineer

SHAHROKH E. RADVAR
No. 68139
EXP. 6/30/10
CIVIL

3183 F. Airway Ave., Suite 123, Costa Mesa. CA. 92626
Phone: 949. 677. 4697. Fax: 949. 340. 5474

CORRECTIVE ACTION PLAN FOR SITE REMEDIATION

UNDERGROUND STORAGE TANK PROGRAM
4954 York Boulevard
Highland Park, California

1.0 INTRODUCTION

Advanced Geoengineering, Inc. (AGE) has been requested by Charles Company to prepare a corrective action plan (CAP) to remediate contaminated soil and ground water at 4954 York Boulevard in Highland Park, California.

1.1 Background and Site History

The site was a former gasoline station, and after abondment and demolition, is currently a vacant lot with a graded soil surface and a chain link fence along the perimeter.

Information regarding the historical environmental activities was taken directly from Allwest Remediation report entitled Quarterly Groundwater Monitoring Report Third Quarter 2008 And Request for Site Closure, dated September 22, 2008. A copy of the site plan depicting monitoring well locations is attached for reference. The following bullet summary presents the environmental history.

- On May 1, 1981, the LAFD received a report of a strong gasoline odor from the storm drain at Avenue 50 and York Boulevard. Shell Oil Company abated the source, and throughout 1982, utilized a dual-phase extraction system to remove free-floating product from the dispenser area at the northeast comer of the Property along Avenue 50. A total of 610 gallons of gasoline were recovered from an estimated release of approximately 800 gallons that resulted from a broken fuel line.

- Sometime between 1985 and 1992, six wells (Wells A-F) were installed, reportedly for a vapor extraction remediation system. Information regarding the operation or use of these wells is not available.

- From March 28 through 30, 1992, Randall Weidner performed a preliminary site assessment at the Property. Twelve borings were drilled to depths of 12 to 21 feet bgs in the underground storage tank (UST) area and near the dispenser islands. Borings B-1 through 8-7 were drilled in the southeast part of the property. Borings B-8 through 8-12 were drilled along the northeast and northern sides of the Property. Analytical data indicated the presence of hydrocarbons and aromatic volatiles in the shallow soil samples from all borings. The highest concentration of total recoverable petroleum hydrocarbons (TRPH) was detected at a depth of 10 feet bgs in boring B1 (adjacent to the waste oil tank) at a concentration of 4,600 parts per million (ppm). The highest concentrations of total petroleum hydrocarbons as diesel (TPHd) and total petroleum hydrocarbons as gasoline (TPHg) were measured in the UST pit area, along piping runs, and near the dispenser islands; generally within soils from surface to the upper 7 feet bgs. Volatile organic compounds (VOCs) showed a pattern of distribution similar to that of gasoline and diesel. The highest concentration of benzene, toluene, ethylbenzene and xylenes (BTEX) were measured to be 18, 160, 66, and 380 ppm, respectively. Free-phase product was measured in two wells (Wells A and B) at thicknesses of 0.67 and 1.17 feet, respectively.

- In May 1992, a Diesel Spill Release Notice was submitted to the LAFD for the Property. The notice listed the Property as a P&M Station.
- In December 1996, Soil Pacific collected groundwater samples from Wells A through F and newly discovered well B-4. TRPH and heavy oil were detected in Well A (no other well was analyzed for TRPH). TPHg and BTEX were detected in Wells A, B, and B-4. Fuel oxygenate methyl tertiary butyl ether (MtBE) was detected in Wells A, B, and B-4.
- On September 24, 1997, NuTech collected groundwater samples from 9 of the 11 groundwater monitoring wells identified in previous reports as on the service station property. Free-phase product thicknesses were again measured to be 0.67 and 1.17 feet in Wells A and B, respectively. Additionally, it appeared that waste oil had been poured down Well A; therefore, NuTech did not collect a groundwater sample for analysis from this well.
- In April 1998, NuTech removed free-phase product from on-site wells using hand-bailing methods and a vacuum track. A total of 316 gallons of petroleum hydrocarbon contaminated liquids (estimated to be a 50:50 oil-to-water mixture) was reportedly recovered from the wells.
- In May 1998, NuTech conducted groundwater sampling at the Property. Wells were examined for free-phase product. Free product was noted only in Well N-V-4. The free-product thickness in Well N-V-4 was not noted in NuTech's report. Groundwater analytical results for this sampling event are summarized in Table 2 of the NuTech report. In the summer of 1999, a licensed contractor removed the USTs.
- On August 6, 1999, stockpiled soil originating from the removal of USTs and associated piping was backfilled into the excavations. Perforated piping was placed in the UST and pump island excavations prior to backfilling. The intended use of this piping was for a future soil vapor extraction system.
- On February 7, 2000, Soil Pacific submitted a workplan to the RWQCB entitled Supplemental Work Plan & Phase II Site Assessment (Remedial Investigation) &

Well Repair, Former P&M Service Station.

- On March 6, 2000, the RWQCB conditionally approved implementation of Soil Pacific's Supplemental Workplan & Phase II Site Assessment.

- On April 16, 2000, Pacific Edge was retained as a subcontractor by the owner's contractor, Innovative Contractor Solutions (ICS), to implement the conditionally approved workplan.

- On April 17 through April 28, 2000, Pacific Edge conducted Phase II field activities at the Site. Soil sampling work included the drilling and sampling of 12 soil borings. Eight new groundwater monitoring wells (MW-12 through MW-19) and six existing wells (C, D, E, F, NV-1, and N-V-2) were sampled. The groundwater flow direction was measured to be south-southeast. During this investigation, free product was measured in only one well (N-V-1) at a thickness of 0.6 inches. This investigation indicated that the mass of contaminants in soil and the shallow groundwater were located at or near the former USTs and pump islands.

- On May 2, 2000, ICS began free-phase product removal within well N-V-1 by placing an oil adsorbent sock in the well. Since this time, three additional wells (N-V-2, MW-14, and MW-15) have been included in the free product removal activity. Recent free-product recovery monitoring events have shown minimal to no hydrocarbon sheen present on the groundwater in these wells.

- Remedial excavations were conducted in October 2001. An unknown volume of soil was excavated from the former UST and fuel dispenser islands areas, then transported off-site for recycling. The excavation area was backfilled with 3/4-inch crushed rock to approximately 5 feet bgs, which was overlain by clean soil backfill.

- Pacific Edge had conducted quarterly groundwater monitoring since April 2000. In general, the groundwater flow direction has been determined to be predominately to the south-southeast. During the April 2000 and the March 2001 monitoring events, the groundwater flow direction was northerly and easterly, which may have been due to accumulation of rainwater in the excavation (backfilled with gravel) following the removal of the USTs. Analytical results indicated that the greatest mass of contaminants in groundwater was located in the areas of the former USTs and pump islands. Analytical results indicated that off-site migration of petroleum compounds has occurred along all boundaries of the property.

- The Source Group, Inc. (SGI) conducted a Phase II " Site Assessment of the property in November and December 2002. The purpose of the work was to assess the extent of soil and groundwater contamination and determine the limits of the off-site migration of hydrocarbons in groundwater. The work included drilling and sampling 14 on-site and off-site soil borings using a hollow stem auger (HSA) drill rig. The 14 soil borings were converted to groundwater monitoring wells, which were subsequently surveyed, developed, gauged, purged, and sampled. Seventy soil samples were analyzed for gasoline-, diesel-, and oil-range hydrocarbons, for BTEX compounds, and for oxygenates. Concentrations of fuel compounds were detected in soil samples from the boreholes for groundwater monitoring wells MW-20 through MW-26. All seven of those boreholes (monitoring wells) are located on site. The highest levels of such fuel compounds were present in the soil along the east-southeast margin of the Property. This is likely caused by the inaccessibility to affected soil with the 1:1 (H:V) sloped excavation wall that was necessary to maintain sidewall stability in the remedial excavation. Based on the historical environmental data relative to the results from this investigation, the predominant mass of fuel constituents in soil was removed during the remedial excavation. The remaining fuel hydrocarbons are present in greatest proportion within the smear zone, along the surface of the water table.

- During the November-December 2002 assessment, SGI collected 25 water samples for analysis of gasoline-, diesel-, and oil-range hydrocarbons, BTEX compounds, oxygenates, and bioremediation parameters. Dissolved-phase fuel constituents were detected in 10 (all on-site wells) of the 21 monitoring wells sampled during this phase of assessment. TPHg and TPHd were present at concentrations ranging from non-detectable (<5 micrograms per liter [IJg/L) to 19,400 IJg/L (MW-22) and non-detectable (<0.50 milligrams per liter (mg/L) to 1.5 mg/L (MW-14), respectively. No dissolved-phase total petroleum hydrocarbons as oil (TPHo) was detected in any of the groundwater samples. Benzene was detected only in groundwater monitoring wells MW-14 and MW-15 at concentrations of 94.6 µg/L and 145 µg/L, respectively. Of the fuel oxygenates detected in the groundwater monitoring wells, MtBE was the most prevalent (detected in 10 monitoring wells), ranging in concentration from non-detectable <2.0 µg/L) to 10,700 µg/L (MW-22). Di-isopropyl ether (DIPE) was detected in six groundwater monitoring wells, ranging from 3.5 µg/L (MW-16) to 198 µg/L (MW-22). All other wells had non-detectable <2.0 µg/L) levels of DIPE. Ethyl tertiary-butyl ether (EtBE), tertiary-amyl methyl ether (tAME), and tertiary-butanol (tBA) were not detected in any of the 21 groundwater monitoring wells during this monitoring event. Groundwater was encountered during drilling between approximately 5 and 20 feet bgs. Static groundwater levels measured on November 26, 2002 ranged from 5.56 to 22.07 feet below tops of casings. The groundwater flow direction is toward the south-southwest at an average gradient of approximately 0.025 feet per foot (ft/ft). Groundwater analytical results from this investigation have provided adequate plume delineation. The wells showed non-detectable to low concentrations of contaminants of concern in the up-, down-, and cross-gradient directions.

- Two observation wells (OW-l and OW-2) were installed by SGI on April 16, 2003. The wells were installed for use in feasibility testing (aquifer and vadose zone).

Test well OW-1 was installed approximately 5 feet northeast of observation well MW-18 and test well OW-2 was installed approximately 17 feet northeast of well MW-18 (used as the pumping well). The 5- and 15-foot soil samples from both borings were submitted to a California state certified laboratory for analysis of total petroleum hydrocarbon (TPH) full carbon chain, BTEX, and fuel oxygenates. None of the target chemicals was detected in any of the soil samples. The wells were constructed with 2-inch diameter, schedule 40 PVC, 0.02-inch slots, #2/12 Monterey Sand in the annulus to approximately 1 foot above the well screen. The well screen was placed from 25 feet bgs to 5 feet bgs. The wells were constructed for feasibility testing only and are not part of the groundwater monitoring program.

- In April 2003, SGI conducted feasibility testing at the Property, which consisted of two aquifer tests and a soil vapor extraction (SVE) test. Test 1 used 4-inch-diameter well MW-18 for groundwater extraction, and on-site wells OW-I, OW-2, MW-23, and MW-14 as observation wells to measure pumping influences (drawdown) in the aquifer during testing. Test 2 used 4-inch diameter well MW-15 for groundwater extraction, and on-site groundwater monitoring wells MW14, MW-16, MW-20, MW-22, and MW-26 as observation wells. To investigate the viability of SVE for site remediation, the effective radius of influence (ROI); advection and vacuum for SVE beneath the Property, and to document flow-versus-vacuum relationships, a soil vapor extraction test (VET) was completed using well MW-14. Results of the feasibility testing were used to determine that soil vapor extraction would be only marginally effective due to the low permeability soil.

2.0 SITE INFORMATION

2.1 Site Location and Description

The Underground Storage Tank Program facility is located within the city of Highland Park, California, southwest of the intersection of York Boulevard and Avenue 50. The properties along York Boulevard area are occupied primarily by commercial businesses, with some scattered residences. The property south of the site are predominately residential. The site was a former gasoline station, and after abondment and demolition, is currently a vacant lot with a graded soil surface and a chain link fence along the perimeter. The subject site lies at an approximate elevation of approximately 560 feet above mean sea level (MSL).

2.2 Geology

The Property is located in the Highland Park area within the northern portion of the Los Angeles Basin. The Highland Park area is bordered by the San Rafael Hills to the north, the Arroyo Seco (an intermittent stream) and Repetto Hills to the east, the Mount Washington group of hills to the south, and the Elysian Valley and Elysian Hills to the west. The Property is located at an elevation of approximately 560 feet above mean sea level (MSL). Locally, the Property is underlain by Recent-age alluvium consisting of sand, silt, clay, and gravel. Lithologic descriptions recorded during previous subsurface assessments show that interbedded layers of silty sand, sandy silt, and clay were encountered, with a discontinuous clay lens encountered in some of the borings.

2.3 Hydrogeology

The Property is located within the Eagle Rock Basin, within in the southeast corner of the Upper Los Angeles River Area. The Raymond Fault and northwest-southeast trending faults in the Repetto Hills act as barriers to groundwater flow from the San Fernando Groundwater Basin. Yield of usable water from the Eagle Rock Basin is moderate, and aquifers have not been well delineated in the site area. The aquifer within the Holocene alluvial deposits is described as poorly sorted, unconsolidated, coalescing alluvial fan deposits of sand, gravel and clay (California Division of Mines and Geology, 1975). According to the LACDPW well information (http://www.ladpw.org/wrd/wellinfo/well.cfm), monitoring well 3987H is located approximately 1,900 feet northwest of the Property. Property. Depth to water in that well, as measured on April 14, 2001, was 5 feet bgs.

3.0 CORRECTIVE ACTION PLAN

3.1 Objectives

The following objectives are part of this Correction Action Plan (CAP):

- To provide a cost effective and low maintenance approach to site remediation and obtain approval of the CAP from the RWQCB;
- To remove the accessible hydrocarbon impacted soil in the southern and eastern edge of the site which is acting as a source of groundwater contamination;
- To accelerate natural attenuation by using oxygen release compound materials;
- To conduct groundwater monitoring; and,
- To achieve "Low Risk Site" status of the site and obtain site closure.

3.2 Proposed Groundwater Clean Up Level

Based on the guidelines in the Interim Guidance for Remediation of VOC Impacted Sites, AGE is recommending that the groundwater at the site be considered a Non-drinking Water Aquifer. The groundwater at the site is shallow, the groundwater is not used as a municipal source, the formation has low deliverability (based on the monitoring wells at the site during purging and sampling), and has the potential for high TDS. AGE is proposing a clean up level for Benzene to be 100 µg/l.

Task A: Remedial Excavation

Excavation of contaminated soils during the UST removal could not be completed at that time without removing support of the adjacent street and property. This impacted soil could potentially contribute to the groundwater contamination. AGE proposes to remove the excavated soils. We propose to remove the impacted soils within sections in an ABC slot cut sequence.

Permits for excavation activities will be obtained from OSHA and the South Coast Air Quality Management District.

Field activities will involve all segments of the excavation process, including on-site monitoring and sampling, backfilling of the excavation, and transportation of contaminated soils to an appropriate recycling/disposal facility.

Task A-1: Pre-field Activities

Prior to excavating, the area will be marked with white paint and Under-ground Service Alert (USA) will be notified for utility clearances. Direct contact with individual utility companies will be made as necessary.

A site and job specific Health and Safety Plan will be prepared. This plan will describe the measures necessary to protect the health and welfare of field personnel.

Task A-2: Excavation of Contaminated Soils

Contaminated soils will be excavated with either a track excavator or a bucket/flight auger. All soils will be monitored with an organic vapor analyzer (OVA) or a photo-ionization detector (PID), and handled in accordance with SCAQMD Rule 1166.

Soil samples will be analyzed on-site by a California-certified mobile laboratory. If the analytical results indicate that soils in the excavation still exceed the cleanup level, the excavation will be deepened or enlarged, whichever is appropriate. When acceptable results are obtained, the excavation will be backfilled with imported soil and/or a self-compacting, excavatable 1-1/2 sack cement slurry.

Task A-3: On-Site Laboratory Analysis

Soil samples will be analyzed on-site by a California-certified mobile laboratory. The samples will be collected in glass jars with Teflon lids, and analyzed for total petroleum hydrocarbons as gasoline (TPH-G) by EPA Test Method 8015-G, for total recoverable petroleum hydrocarbons (TRPH) by EPA Test Method 418.1, and for benzene, toluene, ethylbenzene, total xylenes (BTEX) by EPA Test Method 8020.

Task A-4: Loading, Transportation, and Recycling of Contaminated Soils

Contaminated soils will be transported by a licensed hazardous waste hauler to an appropriate recycling/disposal facility.

Task A-5: Project Management

Project management will include project supervision, scheduling and coordination of office and field activities, quality assurance/quality control, interfacing with the appropriate regulatory agencies, and client consultation.

Groundwater Remediation System

It appears that the area of contaminated soil around the southerly and southeasterly side of the site is currently acting as a source for groundwater contamination. The remedial technologies that have been considered for groundwater remediation are summarized below.

In-situ Chemical injection of Oxygen Release Compounds (ORC)

ORC involves in-situ chemical injection of oxygen release compounds into the groundwater. The ORC application promotes bioremediation, by enhancing the supply of oxygen in groundwater to the naturally occurring microbes that metabolically transform toxic organic compounds into harmless by-products. The ORC material is a proprietary magnesium peroxide compound that is activated by moisture to release oxygen. The product releases approximately ten percent of the available oxygen in the first few weeks, and the balance over a period of six months to a year. Nutrients and microbes can also added to groundwater during the ORC injection process to improve the bio-degradation process. The chemical would be injected via direct-push technology to deliver the chemical slurry to the groundwater.

Slurry Wall

An impermeable slurry wall could be installed around a source area to prevent further migration of contaminated groundwater. The impermeable wall would be installed to the depth of and keyed into an appropriate confining layer. Special construction methods would be needed to construct a slurry wall at the depths appropriate for the Site. Groundwater extraction wells would be installed inside the source area to ensure that groundwater mounding did not occur, which could promote vertical migration through the confining layer and horizontal migration through cracks in the containment walls that could develop over time. The performance of this technology would be monitored through periodic groundwater monitoring downgradient of the treatment zone.

Gas Vapor Barriers

Vapor barriers prevent harmful gas from migrating into structures built on sites with a potential concern for vapor intrusion, and they limit the liability of owners and designers. Gas vapor barriers are becoming an integral part of specifications for projects where there is a known or suspected risk of vapor intrusion. The installation of these barriers is a longterm solution that helps to ensure the safety of buildings and human health.

High density polyethylene [HDPE] systems are generally used as gas vapor barriers. The system consist of a 40 or 60 mil HDPE sheet liner that is rolled out and secured to the grade beams or footings using a stainless steel batten bar. The seams are sealed by heat welding. Plastic boots are shaped and heat-welded around pipes or other protrusions in the application surface and welded for adhesion.

Task 6 Report Preparation

At the conclusion of field activities, a report of the remedial excavation and initial NPDES results will be generated.

Task 7 Project Management

AGE project management includes project oversight and management, client-agency interaction where required, health and safety monitoring of field activities, and written and verbal project updates and communication(s) with Client or designated agent during the course of the project.